



Research Article

The Characteristic of Lada Powder wrapping with various of packaging (biodegradable film of composite film from Sodium CarboxymethylCellulose which syntesized from Pineapple crown, Biodegradable film of Commercial Sodium CarboxymethylCellulose, and Plastics) during storages

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ABSTRACT

This study aimed to evaluate the use of the composite film *Sodium Carboxymethyl Cellulose* on the crown of the pineapple to volatile substances of Lada powder, include piperin content (HPLC), Steps being taken in this research is the manufacture of composite films NaCMC and application in Lada powder. The stages in this research are cellulose extraction step and cellulose modification into CMC, making and characterizing composite film as spice packing and its application as spice packer. Cellulose extraction from pineapple crown with 12% NaOH and carboxymethylation with sodium monochloroacetate. Films of sodium carboxymethylcellulose, polyethylene glycol 400 as plasticizer and emulsifier and coconut oil as hydrophobic component to obtain composite film as a spice packing with mechanical properties such as seal strength, thickness, WVTR and solubility in hot water suitable for application as spice packing with thickness 0.085mm) and 350°C sealing temperature variations. The result of the study of carboxymethyl group of pineapple crown CMC synthesis with HPLC showed that plastic packaging is best compared to using CMC commercial and pineapple crown to lada powder wrapping.

Keywords: Edible film; Piperin content; sodium carboxymethylcellulose; spice packaging;

1. Introduction

Spices that have been processed in powder form need to be maintained in order to be used. According Hariyadi (2008) the quality of a food product will change during handling, processing, storage and distribution. This happens because of interaction with internal environmental factors and external environment. Therefore, food products are given adequate packaging. In general, there are many factors that affect the expiration period of food products. It has been known that there are four main factors, namely: raw materials; processing conditions; packaging

conditions and conditions of storage, distribution and sales. The four factors affect the shelf life of food products. However, the dominant factor in determining shelf life is a critical factor. Critical nature is the most sensitive trait that can be detected by consumers to reject a product (Dewi *et al*, 2004).

Spice packaging used today is a plastic packaging. The use of plastic products as packaging becomes part of everyday needs. Problems encountered when using plastic spice packaging is plastic into waste that can not be recycled so that it will have potential for environmental pollution and the use

of plastic is also not safe for packaged food. According Jirukkakul (2013), Polypropylene (PP) is good used at temperatures less than 140°C, While High density polyethylene (HDPE) good materials are used at temperatures not exceeding 100°C. Polyvinyl chloride (PVC) can be used when the temperature is not above 90°C. If more than 90°C, PVC decomposes and produces Vinyl Chloride Monomer (VCM) which can cause cancer. Edible films began to be developed in an effort to minimize the use of plastic. In addition to non toxic, biodegradable and made from natural sources. Natural materials that can be used for edible film include fat, polysaccharide and protein. CMC is a cellulose modification polysaccharide that can be developed as an edible Composite film and can be applied as a spice packer.

2. Materials and Methods

2.1. Materials

Biodegradable film of composite film from Sodium CarboxymethylCellulose which syntesized from Pineapple crown, Biodegradable film of Commercial Sodium CarboxymethylCellulose, and Plastics.

2.2. Methods

Lada powder wrapped with biodegradable film of from Sodium CarboxymethylCellulose which syntesized from Pineapple crown, Biodegradable film of Commercial Sodium CarboxymethylCellulose, and Plastics and was also analyzed piperine contents during storages. Lada powder samples that had been wrapped biodegradable film of composite film from Sodium CarboxymethylCellulose which syntesized from Pineapple crown, Biodegradable film of Commercial Sodium CarboxymethylCellulose, and Plastics diluted to as much as 10 to 50 ml of aquabides and purified by centrifuged at 12,000 rpm for 20 minutes. The extract was filtered through Millipore filter 0.45 µm and 20 mL of sample was used for HPLC analysis (B.T. Ong, S.A.H. Nazimah, 2006).

3. Results

The results of the analyzes performed on the stored pepper using three types of packaging materials are shown in Fig. 1-6. Figures 1 and 2 show that the piperine content in pepper during the storage using plastic is still quite high. This is because the plastic is a material that is quite airtight, so that pepper is not oxidized or degraded due to air, light and heat. Piperin is the main content of pepper that causes a distinctive taste in pepper such as spicy flavor (Hikmawanti et al., 2016). Pores on the packaging also greatly affect the quality and timing of product storage, because the

more tightly pores on the packaging, the smaller the contact of the product with the outside air.

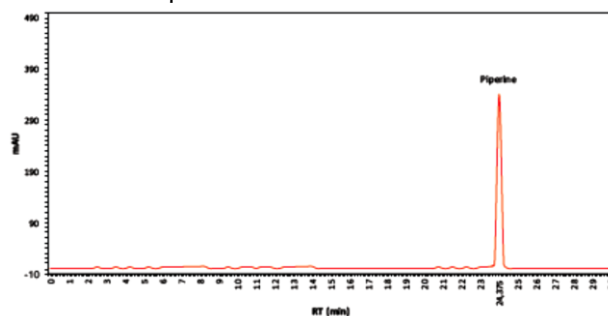


Figure 1. HPLC Chromatogram Result of Piperine on Plastic Packing 1

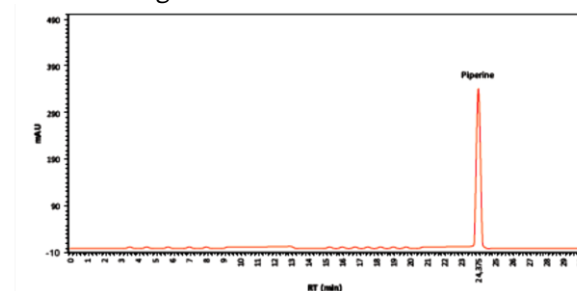


Figure 2. HPLC Chromatogram Result of Piperine on Plastic Packing 2

Pepper or lada is an agricultural commodity in Indonesia. Many pepper is processed into pepper powder for sale as a food ingredient. To maintain the quality of pepper, it needs a good packaging material, not easily degraded and can protect pepper from environmental changes that can damage the quality of pepper (Hikmawanti et al., 2016; Peano et al., 2014). Temperature, light and moisture are the main factors that can damage pepper powder during storage. The use of plastic as a pepper pack has a deficiency because it can pollute the environment (not naturally degraded) therefore biodegradable film is one of the alternatives (Yuniarti and Djaman, 2015).

The result analysis of storage pepper powder in biodegradable material films (one of which CMC) is shown in Figure 3-6. Figures 3 and 4 show that there is a decrease in piperin levels in pepper powder on the packaging using CMC from the pineapple crown when compared with the piperine content of the plastic packaging. This can be because the CMC of the pineapple crown is more easily degraded by heat and light, and has a larger pore than the plastic to allow air to enter and contact with pepper powder.

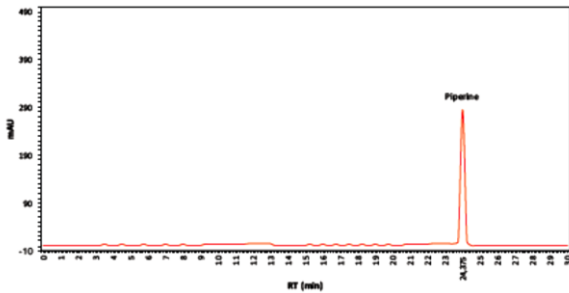


Figure 3. HPLC Chromatogram Result of Piperine on Pineapple Crown CMC Packing 1

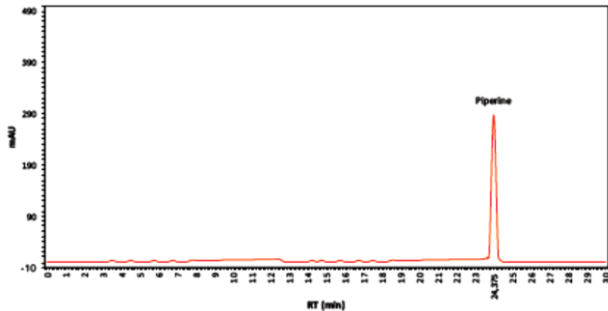


Figure 4. HPLC Chromatogram Result of Piperine on Pineapple Crown CMC Packing 2

Figures 5 and 6 show the lowest levels of piperin compared with the previous treatment. The materials used are commercial CMCs. CMC is not good if used as a packaging material for products stored in the long term because of its less protective. The possibility of commercial CMC pore is greater than that of the synthesized CMC of the pineapple crown, so piperine is damaged or oxidized. Piperin used as a quality standard to determine the quality of pepper storage powder because if there is damage to piperin, then the pepper's distinctive taste will be reduced even disappear and its economic value is also reduced.

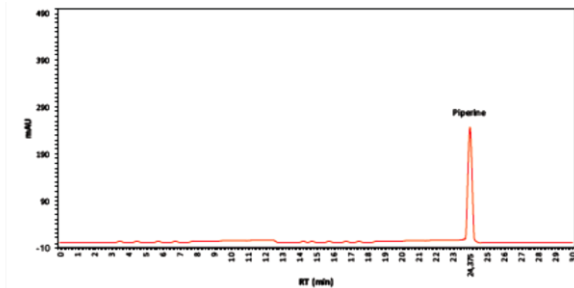


Figure 5. HPLC Chromatogram Result of Piperine on Comercial CMC Packing 1

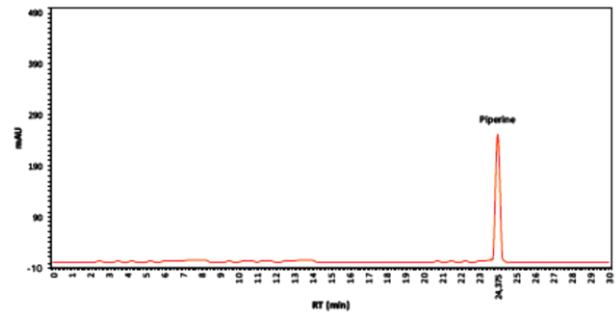


Figure 6. HPLC Chromatogram Result of Piperine on Comercial CMC Packing 2

4. Conclusions and Suggestion

Based on analysis of piperin content using HPLC, pepper storage of powder using CMC from pineapple crown decreased piperin level when compared with plastic storage, but storage rate using CMC pineapple crown was better than using CMC commercial.

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